

BIODIVERSITY IN ANIMAL PRODUCTION: MEANING OF BIODIVERSITY IN ANIMAL PRODUCTION

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What is biodiversity?

The term biodiversity is a neologism and a portmanteau word from bio and diversity. Generally biodiversity is known as variety of species, but it is divided to three subdivision; genetic diversity, which means diversity of gene within a species, species diversity, and ecosystem diversity. Here, I would like to describe about gene diversity and species diversity of animals, especially vertebrate in relation to animal production.

Species diversity of vertebrate animals is variety of fish, reptile, birds, and mammals, each include about 30,000, 3,000, 6,000, 8,600, and 4,500 species, respectively. Human beings utilize less than 50 species as livestock and less than 20 species as laboratory animals. If the total number of the animal species sum up both invertebrates and vertebrates, the number of animal species has increased during the last century. However, the increment is descriptive data, and substantial animal species has decreased. The increment in descriptive number is due to addition of newly found insects especially in tropical areas and fishes, because all extant insect and fishes are not listed yet. Actual number of extant animals has continued to shrink for the last century and erosion of animal diversity is worried not to leave current state for the future.

In addition to species diversity of animals, more serious problem is decrease of genetic varieties within a species of animals. Typically the panther is the represent of shrinkage of genetic variety. In the domestic animals, similar problem occur in the sophisticated domestic animals by breed improvement.

Origin of biodiversity

Before description about erosion of animal diversity, we take a glance how animals diverse. Diversity of animals is the subject of the field of evolution and enormous species occur as the result of adaptive radiation. Among ungulate, perissodactyls had radiated first, and about 16 species remained. Whereas, artiodactyls had radiated later, and about 186 species is remained. Generally later evolved groups perform more adaptive radiation.

Speciation, formation of a new species, occur several reasons. Geographical isolation is one reason to form a new species. For example, migrant fishes landlocked to freshwater long term cannot breed to produce a progeny with marine fish, despite they have a common ancestor. Speciation occurs by chromosome duplication and gene mutation. In natural the organisms with certain population size tend to form new species. Indeed the amount of species has continued to increase past 600 million years, despite of brad scale extinction.

Within a species, animals developed variety of genes. In dogs, we can find numerous breeds, meaning subspecies or intraspecific diversity, and more than 100 breeds are well known from the smallest Chihuahua to the largest St Bernard. Despite of different features and sizes, different dog breeds can mate to produce their progeny. If the animals are allow natural cross breeding, they give rise to great variety of genes. Nowadays we are blessed with variety of animals, but the erosion of animal diversity continues .

Erosion of animal diversity

The erosion of animal diversity means extinction of animal species. Extinction of species is caused by the shrinkage of genetic diversity which was induced by decrease of the population size of a species. During the history of vertebrate evolution many animals appeared by adaptive radiation and disappeared by natural selection. Though the animals not adapted is destined to disappear, recent extinction depends on their habitat destruction by human beings. In recent years, conservation of animal diversity has become a global concern. The destruction of forest clearance for logging and agriculture damages directly the animal habitat, moreover give indirect disturbance to both animal and human beings. The animals has been covered and isolated by the thick forest. Partly destruction of forest induce the exposed the animal to contact with human. The microorganism carried by animals and human was affected each other and give serious diseases known as emerging infection. In human side, Rift valley fever, Ebola hemorrhagic fever, West Nile fever, AIDS are considered derived from animals by the direct contact with carrier animals. In animal side many human diseases bring catastrophic diseases for their population. While selective breeding for livestock improvement is also induced the erosion of animals.

Extinct or endangered animals in Japan and Indonesia

Generally Japan is known as an advanced country of high technology industry. However, about 70 % of the land is occupied by the mountains. Numerous wild animals from temperate to subtropical zone inhabit. Along with the progress of the country we lost some animals, such as Japanese wolf, Japanese otter, Japanese crested ibis, so on. Several species are listed as endangered animals. The endangered birds like crested ibis and stark in Japan were recovered by the introduced species from neighbor countries, but mammals were not recovered.

In Japan Past several decades the conservationist is effort to rescue the animals. Recently another problem occur. The recovered wild animals increased and come close to human habitat. The danger animals such as Asian black bears and brown bears become to attack people to damage. While deer and Japanese serow were also increase by the conservtion. But they became to disserve the forestry and agriculture. Japanese monkey is almost same situation. On the other hand exported exotic animal was released and damage the agriculture and fishery, and they are going to break ecosystem in Japan. For example, fisherman release black bass and bluegill which are carnivorous fish and eat indigenous fish. Released raccoon and turtle is also serious problem. Indian mongooses were introduced to southwest islands in Japan to exterminate venomous snake, but the mongooses preferred to poultry chicken and indigenous rare birds. These

examples show the difficulty of the conservation of rare animals and introduction of overseas animals.

Generally the biological diversity is rich in tropics. Indonesia is known as reservoir of animal resources. Many zoologists are interested in animals in Indonesia, and also several animals such as rhinoceros, orang-utan, tiger are endangered. However, Indonesia keep great variety of indigenous characteristic animals, such as Oahgolin, slow loris, babirusa, anoa so on. These animals are undeveloped fortune.

Effect of domestication to animal diversity

Breed improvement in livestock is also destructive for animal diversity. For example dairy cattle are improved milk production from 2,800 kg/year in 1944 to the maximum more than 20,000 kg/year in 1984, which called super-cow. These breeds decreased their reproduction. The total productivity should be debated. Moreover, these outstanding character was required by farmers and their serum were prevailed for artificial insemination. As a result, the genetic diversity was remarkably decreased. Laying hens are also improved to lay much egg. In 1961 white leghorns lay 211 eggs/year, but 292 eggs/year in 1995. The farmers and egg farms preferred to use the effective chicken. Nowadays these effective laying hens are produced limited big companies as complex triple or more hybrids. The farmer pursued such commercial chicken for the economical reason induced the maintaining the variety of chicken breed. In the world, the animal species useful for human being, such as livestock and laboratory animals is increased, but genetic variety of them were decreased leaving anxiety of the inbreeding degeneration.

Fortunately, animal breeders and animal scientists know how to maintain the animals in minimum population. More than 50 individuals is critical to maintain the breed. However, wild animals is different situation, and required more than 500 individuals to keep. Scientists and technicians of laboratory animals also rescued the endangered animals, volcano rabbits in Mexico.

Value of animal diversity in animal production

Generally wild species evaluated more than 40 billion dollars in the world, though 5,205 animal species (invertebrate, vertebrate) are threaten for extinction. The biodiversity of treasure to leave for the future. The wild species are very important for the domesticated breeds. Domesticated corn was rescued from serious disease by the introduction of wild breed. A new wild breed is said to give the value more than 60 million dollars. Even in the domestic animals the diversity of species and intraspecies will give to advantage.

Prospect to conservation of animal diversity

We enjoy the greatly diversity of animals. Now people aware of importance of biodiversity and responsibility to left for our progeny. However, on the conservation of biodiversity it is easy to say, but we have to confront various problems to resolve.